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1 May 2001

Mr. Sam Borries
On Scene Coordinator
U.S. Environmental Protection Agency
77 West Jackson Boulevard, SE-5J
Chicago, Illinois 60604

TDD No.: 0103-002

Subject: Allied Paper Site
Removal Assessment Work Plan

Dear Mr. Stimple:

Roy F. Weston, Inc. (WESTON) is pleased to submit for your review five copies of the Removal Assessment Work Plan, Revision 1 for the Allied Paper Site in Kalamazoo, Michigan.

Should you have any questions or require additional information, please feel free to contact us.

Very truly yours,

ROY F. WESTON, INC.

Richard H. Mehl, Jr.
Site Manager

Enclosure

cc: Brad Stimple, U.S. EPA
Beth Reiner, U.S. EPA
Tom Short, U.S. EPA
Chuck Roth, FIELDS
Brian Von Gunten, MDEQ (2 copies)
John Kerns, Spectrum Consulting Services, Inc.

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REMOVAL ASSESSMENT WORK PLAN
FOR
ALLIED PAPER - KALAMAZOO RIVER SITE
OTSEGO/PLAINWELL, MICHIGAN

May 2001

Prepared for:

U.S. Environmental Protection Agency
Emergency and Remedial Response Branch
Region V
77 West Jackson Boulevard
Chicago, Illinois 60604

REMOVAL ASSESSMENT WORK PLAN
FOR
ALLIED PAPER - KALAMAZOO RIVER SITE
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TDD No. 0103-002
Document Control No. 67-2A-AAGO

May 2001

Approved By: _____ Date: 5/2/01
Richard H. Mehl, Jr.
Site Manager

Approved By: _____ Date: 5/2/01
Dean Geers
Program Manager

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SECTION 1

INTRODUCTION

1.1 PURPOSE AND ORGANIZATION

1.1.1 Purpose

On 20 March 2001, U.S. Environmental Protection Agency (EPA) Region V On-Scene Coordinators (OSCs) Sam Borries and Brad Stimple directed (TDD # 0103-003) the Roy F. Weston, Inc. (WESTON®) Superfund Technical Assessment and Response Team (START) to develop a Removal Assessment Work Plan prior to initiating a Removal Assessment at the Allied Paper - Kalamazoo River Site located between the Otsego City dam in Otsego, Michigan and Main Street in Plainwell, Allegan County, Michigan. The purpose of this Work Plan is to define the tasks and sampling activities to be performed in order to provide more accurate analytical data for modeling the extent of polychlorinated biphenyl (PCB) contamination in the Kalamazoo River sediments and floodplain soils.

1.1.2 Sample Collection Objectives

Each of the sample collection activities described in this Removal Assessment Work Plan address sample collection objectives outlined in the Draft Kalamazoo River 2001 Removal Assessment FIELDS Proposal (20 March 2001) (Appendix A). Sample collection activities are structured to satisfy the five data collection objectives (FIELDS) listed below:

- Dynamics of PCB and River Sediment/Soil - This assessment will provide a more complete understanding of the relationship of PCBs and dioxins in the Kalamzoo River sediment/soil to promulgate the direction of future Kalamazoo River sampling and potential remediation activities.

- Provide Data for Comparison to 1994 Sampling Event - Sample collection and analysis will provide data for comparison between the 1994 sampling event and this removal assessment area.

- Delineation of Soil/Sediment Matrix - Sample analysis will determine the delineation and extent of contamination of sediments, exposed sediments, and floodplain soils.

- Removal Volume Estimation - This sampling event will refine the volume estimation of contaminated sediment.

- Provide Data for Cost Estimation - Data from analytical results will aid in the definition and evaluation of alternative remedies and provide criteria for a more refined cost analysis.

1.1.3 Work Plan Organization

This Removal Assessment Work Plan is divided into five sections including:

Section 1 - The remainder of this section presents an overview of the site background and history.

Section 2 - The scope of services section presents the planned project activities and provides the rationale and the sample collection procedures that will be performed through the implementation of the Removal Assessment Work Plan.

Section 3 - The project team organization documents the responsibility and authority of the organizations and key personnel involved with the implementation of the Removal Assessment Work Plan, and provides a description of the key personnel directing the Removal Assessment.

Section 4 - The project schedule provides a schedule for Removal Assessment activities.

1.2 SITE BACKGROUND

1.2.1 Site Background/History

In the U.S., PCBs were produced as mixtures of PCB congeners for commercial purposes exclusively by Monsanto Industrial Chemicals Company under the trade name Aroclor. Although most PCBs produced in the U.S. were used in electrical components, they were also used for other applications including the manufacture of carbonless copy paper from 1957 through 1971.

PCBs have entered the Kalamazoo River by several routes including direct discharge such as wastewater effluent, indirect discharge through publicly owned treatment works (POTWs), and non-point source runoff from upland areas. Sources that contributed PCB to the river included paper manufacturing facilities that recycled paper between the late 1950's and early 1970's, and a variety of other industries that used PCB products.

The former Plainwell, Otsego City, and Trowbridge dams, which are owned by the MDNR, were permanently opened by the MDNR and the impoundments drawn down to their sill levels in the early 1970s. After the drawdown of these impoundments, sediments that were once covered by the water column were exposed and now comprise floodplains in these areas. The three MDNR-owned dams were inspected in 1995 and 1996 by the MDNR and again in 1999 by Camp, Dresser and McKee (CDM), MDEQs contractor. All three received a high-hazard-potential classification due to their crumbling structures and unsafe conditions. The dams are currently owned by the Wildlife Division of the MDNR and are operated by a representative of the Allegan State Game Area (BBL, 2000).

Four separate areas adjacent to the Kalamazoo River and Portage Creek (tributary) were designated as operational units which include: Allied Paper, Inc. (including former Bryant Mill Pond), Willow

Boulevard/A-Site, King Highway Landfill, Willow Boulevard/A-Site, and the 12th Street Landfill. These areas had been used as disposal sites for paper-making residuals and were considered to be potential continuing sources of PCBs into the river and creek. Although carbonless paper was not manufactured in the Kalamazoo River basin, it was shipped to the area mixed with other office paper destined for recycling at the Kalamazoo River Study Group (KRSG) mills. The paper recycling process produced a waste stream containing PCBs (BBL, 2000).

In 1994, a group of four PRPs calling themselves the Kalamazoo River Study Group (KRSG) conducted a Remedial Investigation (RI) consisting of a sampling assessment of the Kalamazoo River from Morrow Lake to Lake Allegan (Phase I of the river) which included the current investigative area. The RI was conducted pursuant to an Administrative Order by Consent (AOC) issued by the Michigan Department of Natural Resources (MDNR). The purpose of the RI was to characterize the site, evaluate the actual or potential hazards to public health and the environment, and collect and analyze data to evaluate alternatives for the Feasibility Study (FS).

The 1994 RI sediment sampling assessment included the collection of 1,076 samples that were analyzed for PCBs. Sample locations included instream sediment, exposed sediment, and floodplain soils. The surface area of the river and exposed sediments in former impoundments encompass 3,800 acres with an average of one core/grab sample per 3.5 acres of potentially contaminated material.

Forty-one samples were collected during the 1994 RI in the proposed investigative area for this Removal Assessment Work Plan. PCB concentrations in the samples collected ranged from non-detect to 74 ppm. PCB concentrations in 30 of the 41 samples were non-detect or less than 1 ppm. Nearly all of the 6-inch segmented core samples had a maximum sediment or soil depth of approximately 24 inches (BBL, 2000).

1.2.2 Site Description

The investigative area of the Kalamazoo River which has been divided into two sections between the Otsego City dam in Otsego, Michigan and the Main Street bridge in Plainwell, Michigan (Figure-1-1). Section one is the segment of the river from the Main Street bridge in Plainwell, Michigan to the Plainwell Dam. The channel length is approximately 1.8 miles. The upstream portion is somewhat channelized and the downstream portion is a former impoundment (FIELDS, 2001). In this 44-acre section, the river has an average width of approximately 197 feet with an average depth of approximately 3.7 feet and is comprised of historically-deposited sediments that are currently vegetated (BBL, 2000). Section two is the segment from Plainwell dam to Otsego City dam in Otsego, Michigan which also has a channel length of approximately 1.8 miles. The upstream portion of the river has multiple (possible shifting) channels and a more extensive flood plain. A single channel resumes in the downstream portion of this section (FIELDS, 2001). Section two encompasses approximately 96 acres and an average width of approximately 450 feet and average depth of approximately 2.5 feet. The impoundment has retained large amounts of silt, and the adjacent shoreline consists of swamp and marsh areas (BBL, 2000).

SECTION 2

SCOPE OF SERVICES

2.1 PROJECT PLANNING

Project planning activities include effort related to the following activities:

- Meetings.
- Conduct site visit.
- Evaluate existing information.
- RA Work Plan.

2.1.1 Meetings

2.1.1.1 Kick-off Meeting

A kick-off meeting was conducted with the U.S. EPA on 20 March 2001. The following U.S. EPA personnel took part in the meeting:

- Sam Borries, OSC
- Beth Reiner, RPM
- Brad Stimple, OSC
- Tom Short, RPM
- Chuck Roth, FIELDS
- Tim Drexler, FIELDS

The following WESTON personnel took part in the meeting:

- Richard H. Mehl, Jr.

During the kick-off meeting, the Draft FIELDS Proposal dated 20 March 2001 was reviewed and the project scope of work was discussed.

2.1.1.2 Project Meetings

On 19 April 2001, U.S. EPA and WESTON START met to discuss the analytical needs or the project and the laboratory procurement to meet those needs. The following U.S. EPA personnel took part in the meeting:

- Sam Borries, OSC
- Beth Reiner, RPM
- Brad Stimple, OSC
- Tom Short, RPM
- Chuck Roth, FIELDS
- John Bing-Canar, FIELDS

The following WESTON personnel took part in the meeting:

- Richard H. Mehl, Jr.
- Donald B. Paxton

A teleconference was conducted with Terry Smith of the U.S. EPA Contract Laboratory Program (CLP) and Southwest Laboratories of Oklahoma (SWOK) Harry Borg to discuss laboratory services, analytical parameters, laboratory methods (Method 8082) necessary to obtain the detection limits required for the sampling event and laboratory turnaround times. U.S. EPA and WESTON also discussed sampling strategies further to incorporate the new sample map provided by FIELDS with river transects.

2.1.2 Conduct Site Visit

On 11 April 2001, the U.S. EPA was accompanied by WESTON START to observe site conditions and determine proposed sampling strategy feasibility. U.S. EPA OSC Stimple and RPM Short, led the site walk with EPA FIELDS, WESTON START, Michigan Department of Environmental Quality (MDEQ), Michigan Department of Natural Resources (MDNR), and Camp Dresser and McKee, Inc. (CDM) present.

2.1.3 Evaluate Existing Information

WESTON will obtain, copy, and review available background information related to the Site. The background information will be obtained from the Regional Records Center, or the OSCs and RPMs. The data review will be conducted prior to initiation of site investigation activities. Specific information that will be evaluated includes the Draft Remedial Investigation Report for Phase 1 of the river.

2.1.4 RA Work Plan

WESTON will prepare and submit a RA Work Plan in accordance with the FIELDS Proposal and discussions during the kick-off and project meetings.

2.1.4.1 Develop RA Work Plan

WESTON will prepare a work plans to address the RA activities. The RA Work Plan will include site-specific background information, site-specific project plans, appropriate U.S. EPA guidance, and technical direction provided by the U.S. EPA OSCs and RPMs.

The Work Plan follows the outline in the FIELDS Proposal and includes the following:

- Identification of RA elements and associated tasking: This includes reviewing site documentation, previous field sampling and analysis activities. Output of this task will be a detailed work breakdown structure of the RA project.

- Technical Approach: The technical approach includes a description of each task; the technical approach for performing each task and assumptions used; any information to be produced during and at the conclusion of each task; and a description of the deliverables to be produced.

- Schedule: The schedule includes specific dates for completion of each required task; and major submittals identified in various tasks and their due dates. The schedule also includes information regarding timing, initiation, and completion of critical path milestones.

- Project Staff: The project staff section includes the proposed personnel that will be utilized to complete the activities defined for each task based on their qualifications and experience.

2.1.4.2 Revised RA Work Plan (if necessary)

WESTON will revise the Work Plan to incorporate U.S. EPA's comments into the final Work Plan.

- Prepare and Submit Revised RA Work Plan: A revised RA Work Plan will be prepared and submitted to incorporate made during U.S. EPA's review.

2.2 PREPARATION OF SITE-SPECIFIC PLANS

Site-specific planning documents developed for previous field investigation activities include:

- Health and Safety Plan.
- Quality Assurance Project Plan (QAPP).
- Field Sampling Plan (Appendix A of QAPP)

2.2.1 Health and Safety Plan

In accordance with Occupational Health and Safety Administration (OSHA) guidelines and WESTON corporate health and safety policy, a site-specific health and safety plan (HASP) is required for all field tasks. The HASP specifies employee training, protective equipment, medical surveillance requirements, standard operating procedures, and a contingency plan in accordance with 29 CFR 1910.120.

2.2.2 Quality Assurance Project Plan and Field Sampling Plan

WESTON will prepare a Quality Assurance Project Plan (QAPP) which includes:

- Quality Assurance Project Plan: A QAPP will be prepared to address the RA field investigation activities. The QAPP will be prepared in accordance with EPA QA/R-5. The QAPP will describe the project objectives and organization, functional activities, and quality assurance/quality control protocols that will be used to achieve the desired Data Quality Objectives (DQOs). The DQOs will reflect the use of analytical methods for identifying contamination and addressing contamination consistent with the levels for remedial action objectives identified in the FIELDS Proposal.

- Field Sampling Plan: A Field Sampling Plan (FSP) will be prepared to address the RA field investigation activities. The FSP will be submitted as an appendix to the QAPP. The FSP will define the sampling and data collection methods that will be used for the project. The FSP will include sampling objectives; sampling locations and frequency; and a breakdown of the samples that will be analyzed through the Contract Laboratory Program (CLP), U.S. EPA Central Regional Laboratory (CRL), or other laboratories. The FSP will consider the use of all existing data and shall justify the need for additional data whenever existing data will meet the same objective.

2.3 FIELD INVESTIGATION

2.3.1 Sample Location Design

Samples will be collected from two preliminary site areas that are expected to be a representative cross-section of sediment type, flow characteristics, and histories. Section one is the area of the river from Main Street in Plainwell to the Plainwell dam. The channel length is approximately 1.8 miles. Section two is the area from Plainwell dam to Otsego City dam which also has a channel length of approximately 1.8 miles. Sample locations need to contain all three substrates of concern including; in-stream sediment, exposed sediment, and floodplain soil (FIELDS, 2001).

FIELDS personnel will identify and flag all sampling locations and each sampling location will be located in real-time using a total station Global Positioning System (GPS).

2.3.1.1 Stage One-Grid and Transect Sampling

During stage one, approximately 120 locations will be sampled, 59 in section one and 61 in section two (Figure-2-1). The number of samples will be proportional to each area sampled using a systematic grid in the floodplain areas and transects in the river and exposed sediments. Section one sample locations will be dispersed throughout a 300-foot grid in the floodplain with eight transects across the river within the section. Section two samples will be dispersed throughout a 500-foot grid in the floodplain with five transects across the river. At each location, a sample will be collected from one of three of the target substrates: instream sediment, exposed sediment, and floodplain soil using a core sampler lined with a Lexan tube. Instream sediment samples will be collected from the following intervals; 0-6 inches (in), 6-12 in, 12-24 in, and one-foot increments thereafter until refusal. Exposed sediment and floodplain soil will be collected following intervals; 0-6 in., 6-12 in., 12-24 in., 24-36 in., 36-48 in., and 48-60 in or until refusal or until native soil is visible. Each sample interval will be placed in a re-usable stainless steel bowl and homogenized. Samples will

be placed into an 8-ounce clear wide mouth glass sample jar and a 4-ounce amber wide mouth glass sample jar with a teflon-lined cap and cooled to four degrees Celsius (°C). The 8-ounce sample will be analyzed for PCBs (aroclors) and the 4-ounce sample for total organic carbon (TOC). Twenty samples from the section one first interval (0-6 in) sample locations will be collected for dioxin analysis. The sample will be placed in a 4-ounce amber wide mouth glass sample jar with a teflon-lined cap, cooled to 4°C and analyzed for dioxins.

2.3.1.2 Stage Two-Radial Sampling

Stage two will implement a radial grid using an adaptive fill around selected "hot spots" (Figure-2-2) determined from analytical results received from stage one sampling. Sampling will provide data for correlation analysis and to determine "hot spot" size. Four cluster areas will be collected, two for predominantly instream sediment and two for predominantly exposed sediment for a total of 256 sample locations. The radial clusters will likely encompass instream sediment, exposed sediment, and floodplain soil. Cores will be collected with predetermined distances of 5 feet (ft) 10 ft, 20 ft, 40 ft, 80 ft, 160 ft in each of eight directions (radially). Eight additional sample locations are located in both the 80-foot and 160-foot distances for a total of 64 locations on each cluster. At each location, a sample will be collected from one of three of the target substrates: instream sediment, exposed sediment, and floodplain soil. Instream sediment samples will be collected from the following intervals; 0-6 inches (in), 6-12 in, 12-24 in, and one-foot increments thereafter until refusal. Exposed sediment and floodplain soil will be collected following intervals; 0-6 in., 6-12 in., 12-24 in., 24-36 in., 36-48 in., and 48-60 in. until refusal or until native soil is visible.. Each sample interval will be placed in a re-usable stainless steel bowl and homogenized. Samples will be placed into an 8-ounce clear wide mouth glass sample jar and a 4-ounce amber wide mouth glass sample jar with a teflon-lined cap and cooled to four degrees Celsius (°C). The 8-ounce sample will be analyzed for PCBs (aroclors) and the 4-ounce sample for total organic carbon (TOC). FIELDS will flag or mark each location via GPS.

2.3.2 Sample Collection Procedure

Sample teams will collect instream samples in areas of the river with weak currents and shallow water (<3 feet deep) using waders and samples in areas with deeper water or stronger currents will require the use of a 12 -foot John-boat with a center sampling port equipped with a small motor. To obtain the instream sediment samples from the Kalamazoo River, a three-inch diameter core sampling apparatus constructed of polyvinyl chloride (PVC) with Lexan® tubing will be driven by hand until refusal. Samples will be collected from the following intervals; 0-6 inches (in), 6-12 in, 12-24 in, and one-foot increments. Sample equipment will be decontaminated as outlined in the Field Sampling Plan (FSP). GPS positions (+/- 1 centimeter (cm) horizontal, +/- 2 cm vertical) will be taken for true elevation of each core (FIELDS, 2001).

An All Terrain Vehicle (ATV) or a four-wheel-drive truck, equipped with a hydraulically pressure driven soil sampler (Geoprobe®), will be implemented to obtain consistent core depths in floodplain soil, and exposed sediment to a depth of 60 inches or until refusal or until native soil is visible. The truck-mounted Geoprobe drives a 3-foot long, 4-inch diameter hollow sampling rod section into the ground by means of a motor-driven hydraulic hammer. Discrete samples are collected at desired depths. After the rod has been driven into the soil to the desired depth and the sample collected, the motor may be reversed to remove the sampling rod. The hollow rods are lined with a Lexan insert to collect samples and help preserve the cleanliness of the interior of the rod. After the rod has been extracted from the ground, the Lexan insert is removed and the sample is geologically logged, and samples are collected and preserved for laboratory analysis.

A hand-powered Geoprobe® unit or equivalent hand-powered probe will be used at locations that are inaccessible with the ATV-mounted or truck mounted Geoprobe®. The hand-powered unit consists of a 3-foot long, 2-inch diameter hollow sampling rod that is driven into the ground by means of a hand-driven lever and hammer system. Discrete samples are collected at the desired depths. After the rod has been driven into the soil to the desired depth and the sample collected, the

rod is extracted by means of a built-in jack removal system. The hollow rods are lined with a plastic (Lexan®) insert to collect samples and help preserve the cleanliness of the inside of the rod. After the rod has been extracted from the ground, the Lexan insert is removed and the sample is geologically logged. The rods are decontaminated between sample locations.

A bucket auger may also be used to collect soil samples when soil conditions prevent use of the Geoprobe® sampler. The T-handled stainless-steel bucket auger is manually augered into the ground and soil enters the 2- or 4-inch diameter bucket sampler. The auger and discreet interval of soil is retrieved from the borehole in 6- inch sections. Discrete samples are collected at desired depths. The soil is geologically logged and screened for desired parameters. The auger and extension rods are decontaminated between sample locations.

FIELDS personnel will conduct a GPS survey of the boundaries of the exposed sediments and flood plain which are needed for volume determination and interpolation. A bathymetric survey, dependent upon water depth in the study area, will be conducted to give accurate elevations of cores for three-dimensional interpolations. If water levels are too shallow (under three feet) core locations will be determined using a total station GPS (1 cm accuracy) to give the necessary vertical accuracy. Sediment probes will be used to determine sediment thickness and estimate the total sediment volume. Probe locations will be predetermined based on a sampling grid and will be located in real-time using GPS (+/- 1 meter) (FIELDS, 2001).

2.4 ANALYTICAL PARAMETERS

Chain-of-Custody forms for Contract Laboratory Program (CLP) laboratories will be produced using U. S. EPA Forms II software and included with the samples for shipment. Samples will be sent to SWOK and analyzed for PCBs (aroclors) under U. S. EPA CLP. TOC samples will be shipped to the U.S. EPA Central Regional Laboratory (CRL) for analysis. Twenty samples from stage one, section one will be analyzed for dioxins through the U.S. EPA Region V Special Analytical Services

(SAS) contract with SWOK. The turnaround time for PCB analytical results will be seven days, all others will be standard turnaround times.

2.5 FIELD QUALITY CONTROL SAMPLES

Field duplicates will be collected at a frequency of one per 10 project samples per parameter. Field duplicates will receive a unique sample identification number and will be submitted to the laboratory as a "blind" duplicate to avoid laboratory bias. Field duplicates are analyzed to check for sampling and analytical reproducibility.

Matrix spikes provide information about the effect of the sample matrix on the preparation and measurement methodology. MS/MSD samples for organic analyses will be analyzed at a minimum of one per 20 investigative samples.

2.6 ANALYTICAL LABORATORY PROCEDURES

Samples collected for chemical analyses will be analyzed by the analytical laboratory, which will follow the methods specified in SW-846, or other criteria as appropriate to the specified method. These methods are listed in Tables 2-1 and 2-2. The actual detection limits obtainable for a specific sample depend upon sample characteristics and possible matrix interference. Departures from the detection limits will be consistent with CLP or other applicable requirements including method adherence, deliverables, audit procedures, and a performance evaluation equivalent to the QA/QC procedures in CLP SOWs for inorganics and organics. Note that the analytical laboratory will be performing organic chemical analyses in accordance with non-CLP SW-846 Methods. However, the analytical laboratory will perform these methods using full CLP QC and then prepare and submit the equivalent of a full CLP data package.

2.7 DATA VALIDATION/MANAGEMENT

All laboratory analytical data will be validated by a WESTON Data Validator. The guidelines for data validation are presented in:

- Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses– U.S. EPA, October 1999.
- Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses –U.S. EPA, February 1994.

Upon receipt of the laboratory data package, the Sample Management Coordinator will inspect each package for completeness. Completeness is evaluated by auditing the data package for:

- Chain-of-Custody records.
- Technical holding times.
- Required analytical methods.
- Reporting limits.
- Reporting format.
- Laboratory and field QC reporting forms (blanks, calibrations, laboratory control samples, duplicates, matrix spikes, etc., as appropriate).
- Appropriate supporting data.
- Case narrative.
- Completeness of results.

Details of any missing, incomplete or incorrect parts of the data packages will be stamped "Resubmitted on [date]", attached to the original data package, and returned to the analytical laboratory. All persons receiving data packages will receive copies of the resubmitted data from the

laboratory. Once it has been determined that a complete data package has been provided by the laboratory, the data package(s) will be given to the data validator.

Analytical data acquired during completion of this project will be managed using the EquIS® data management system by Earthsoft, Inc. Electronic data deliverables (EDDs) will be prepared by the laboratory in accordance with U.S. EPA Region 5 specifications and loaded to EquIS®. All pertinent chain-of-custody data, analytical results, QA/QC information, and data validation flags will be loaded to the database to support the project. The format of the EDDs will be evaluated prior to loading using the EquIS Electronic Lab Data Checker. Data tables necessary to illustrate the extent of soil contamination will be generated using the EquIS® CrossTab Report Writer.

2.8 SAMPLE PACKAGING, STORAGE, AND SHIPMENT

Sample containers will be labeled and shipped with a sample tag affixed to each container. Samples will be placed in plastic zipping bags. Bagged containers will be placed in appropriate transport containers and the containers will be packed with appropriate absorbent material, such as vermiculite, and preserved with ice to 4° Celsius. All sample documents will be affixed to the underside of each transport container lid. The lid will be sealed with shipping tape and custody seals will be affixed to the transport container. Transport containers will be labeled with the origin and destination locations.

Regulations for packaging, marking, labeling, and shipping of hazardous materials and wastes are promulgated by the U.S. Department of Transportation (DOT). Air carriers which transport hazardous materials require compliance with the current International Air Transport Association (IATA) Regulations, which apply to the shipment and transport of hazardous materials by air carrier. START will follow IATA regulations to ensure compliance.

2.9 SITE HEALTH AND SAFETY

The Site Health and Safety Plan meets the occupational Safety and Health Administration (OSHA) requirements of 29 CFR 1910.120. The HASP will be read and signed by each individual from WESTON, WESTON's subcontractors, and all other personnel who will be on site. Also, WESTON will have all underground utilities located prior to the start of the scheduled field work.

Elements required by 29 CFR 1910.120 are outlined in the HASP. These elements concern the regulatory status of the site; hazard assessment and equipment selection; source/location of contaminants and hazardous substances; chemical, biological, radiation, and physical hazards of concern; medical surveillance; site hazard monitoring program; and personal protective equipment (PPE) for employee protection, monitoring and decontamination. In accordance with WESTON's PPE program and 29 CFR 1910.132, the Site Health and Safety Coordinator (SHSC) and/or the Site Manager have evaluated conditions and verified that the PPE selection, outlined in the HASP is appropriate for the hazards known or expected to exist.

2.10 SITE CONTROL MEASURES

Site control measures include a description of the contamination zone, safe zone boundary and other requirements of 29 CFR 1910.120. Contamination zone and safe zone boundaries are yet to be determined for each of the properties under investigation, and will therefore be delineated prior to conducting soil sampling.

Personnel and equipment decontamination will be conducted in accordance with WESTON's HASP and SOPs as part of the Site-Specific Sampling Plan. The procedure provides guidance for the categorization, staging, and documentation/tracking of IDM. Decontamination is performed as a quality assurance measure and a safety precaution. It prevents cross-contamination among samples and helps maintain a clean working environment for the safety of all field personnel. All used PPE

materials will be properly contained, bagged, labeled and left on site to be disposed of at the discretion of the U.S. EPA.

2.11 SITE PREPARATION

Prior to beginning soil sampling at each of the properties that could be served by or connected to utilities, a search will be conducted by the SHSC and the local utility protection service to identify any overhead and underground utilities such as:

- Electrical lines and appliances
- Gas lines
- Pipelines
- Steam lines
- Water lines
- Sewer lines
- Pressurized air lines
- Cable Television lines
- Telephone lines

Access agreements will be obtained for the properties under investigation by the U.S. EPA. With the exception of notifying the property owners and Michigan's utilities clearance service (MISS DIG) 48 hours prior to conducting any subsurface soil sampling, minimal site preparation is required for execution of this Work Plan. WESTON's SOP Number FLD 34-Utilities is part of the Site-Specific Sampling Plan and/or HASP.

2.12 REMOVAL ASSESSMENT REPORT

WESTON will prepare a Removal Assessment Report that accurately establishes the site characteristics such as media contaminated, extent of contamination, and the physical boundaries of the contamination. Analytical results will be organized using EquIS® software to produce a data

summary. WESTON will initially prepare a draft Removal Assessment Report which includes the following:

- Site Background. WESTON shall assemble and review available facts about the regional conditions and conditions specific to the site.

- Investigation
  - Field Investigation and Technical Approach
  - Chemical Analysis and Analytical Methods
  - Field Methodologies
    - Instream Sediment
    - Exposed Sediment
    - Floodplain Soil

- Site Characteristics
  - Geology
  - Hydrology
  - Demographics and Land Use

- Nature and Extent of Contamination
  - Contaminant Sources
  - Contaminant Distribution and Trends
  - Modeling
  - Mass/Volume Estimate

- Fate and Transport
  - Contaminant Characteristics
  - Transport Process
  - Contaminant Migration Trends

- Summary and Conclusions

After the U. S. EPA reviews the draft RA Report, WESTON will incorporate U. S. EPA comments and submit the final RA Report.

SECTION 3

PROJECT TEAM ORGANIZATION

Operational responsibilities involving execution and direct management of the technical and administrative aspects of this project have been assigned as follows:

U.S. EPA Remedial Project Manager–Ms. Beth Reiner and Mr. Tom Short are the the U.S. EPA RPMs for this project. Ms. Reiner/Mr. Short has overall responsibility for all phases of the Allied Paper - Kalamazoo River Project, in conjuction with the OSCs.

U.S. EPA On-Scene Coordinators– Mr. Sam Borries and Mr. Brad Stimple are the U.S. EPA OSCs for this project. Mr Borries and Mr. Stimple will work in conjuction with the U.S. EPA RPMs on this removal assessment project.

U.S. EPA FIELDS Project Managers–Mr. Chuck Roth of the U.S. EPA FIELDS group will be responsible for assisting with and identifying sample locations as well as determining which locations will undergo analysis.

State Project Managers–Mr. Brian Von Gunten of the Michigan Department of Environmental Quality (MDEQ) is the state project manager. The state project managers will be involved during all phases of this removal assessment.

WESTON Program Manager—Mr. Dean Geers is the WESTON Program Manager. The Program Manager has overall responsibility for the work assignment. The Program Manager is responsible for ensuring that the project meets all U.S. EPA and MDEQ objectives and quality standards. He is also responsible for ensuring that all work is executed in accordance with the U.S. EPA's technical directives. The WESTON Program Manager is responsible for assigning and monitoring the

functions and responsibilities of the WESTON Project Manager. In addition, he will commit the necessary resources and personnel to meet the objectives of this removal assessment.

WESTON Project Manager–Mr. Richard H. Mehl, Jr., is the Project Manager. The Project Manager is responsible for implementing the project objectives utilizing the personnel assigned. The Project Managers primary function is to ensure that the technical, financial, and scheduling objectives are achieved successfully. The WESTON Project Manager will coordinate with the WESTON Program Manager, and Quality Assurance Manager and will be the major point of contact and control for matters concerning the project. His other responsibilities include:

- Coordination and management of project personnel.
- Project scheduling.
- Coordination and review of required deliverables.
- General QA of field activities.
- Represent the project team at meetings and public hearings.
- Exercise overall responsibility for all audits under the START contract.

WESTON START Project Leader/Field Team Leader–WESTON will designate a START Project Leader/Field Team Leader that will be responsible for the daily direction of the team members regarding the TDD-specific tasks. The START Project Leader/Field Team Leader will provide the initial technical review of all deliverables and data collection activities. In essence, this person will be responsible for the management of the field team and the supervision of all field activities in the absence of the WESTON Project Manager.

WESTON Site Health and Safety Cooordinator–WESTON will designate a person to be responsible for implementing the Health and Safety Plan. The SHSC will perform health and safety monitoring and ensure compliance with all health and safety requirements.

SECTION 4

PROJECT SCHEDULE

4.1 SCHEDULE

The schedule identifies the sample collection activities and reporting throughout the duration of the project (Figure - 4-1).

SECTION 5

REFERENCES

5.1 REFERENCES

BBL (Blasland, Bouck & Lee, Inc.). 2000. Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site RI/FS Remediation Investigation/Feasability Study and Supplemental Reports. Syracuse, NY. 29 October.

FIELDS (U. S. Environmental Protection Agency FIELDS). 2001. Kalamazoo River 2001 Removal Assessment FIELDS Proposal. Chicago, IL. 20 March.

TABLES

Table 2-1 Stage One Sampling

Summary of Sampling and Analysis Program for Allied Paper - Kalamazoo River Site Otsego/Plainwell, Michigan

Sample Matrix	Laboratory Parameters	Analytical Method	Investigative No.	Field Duplicate No.	MS/MSD[1] No.	Matrix Total*
Floodplain Soils	CLP PCBs (aroclors)	8082	144	15	8	159
	Dioxins	8280A, 8290	6	1	1	7
	CRL TOC	9060	144	15	8	159
Instream Sediment	CLP PCBs (aroclors)	8082	196	20	11	216
	Dioxins	8280A, 8290	8	1	1	9
	CRL TOC	9060	196	20	11	216
Exposed Sediment	CLP PCBs (aroclors)	8082	140	14	8	154
	Dioxins	8280A, 8290	6	-	-	6
	CRL TOC	9060	140	14	8	154

[1] MS/MSDs are not additional samples, but are instead investigative samples on which MS/MSD analyses are performed
* The matrix total does not include MSMDs and duplicate/spike samples
**This table accounts for a total of approximately 480 samples collected at 120 locations with four depth intervals It is estimated that samples will be relatively evenly divided between floodplain soils, instream sediment, and exposed sediment

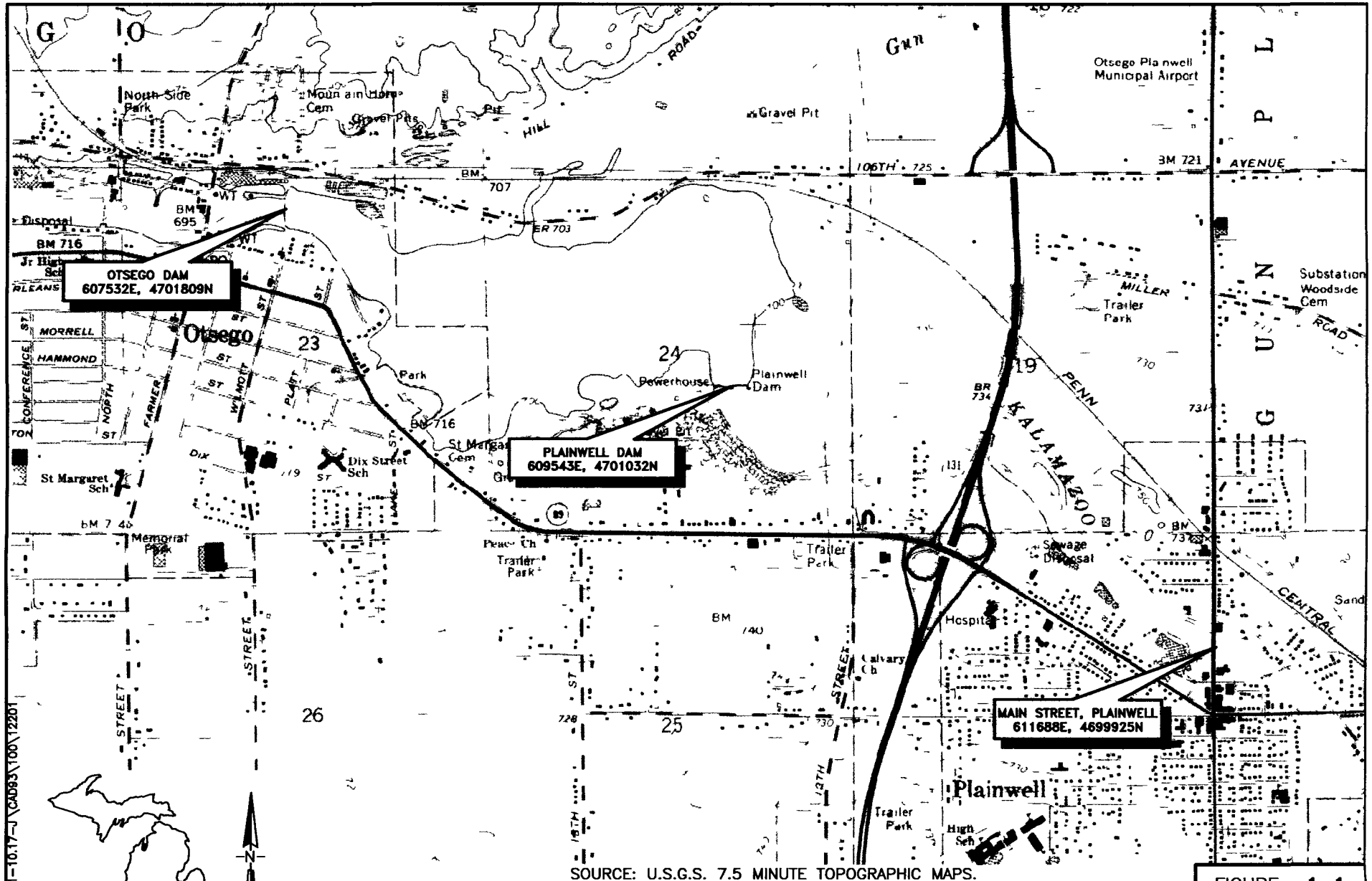
Table 2-2 Stage Two Sampling

Summary of Sampling and Analysis Program for Allied Paper - Kalamazoo River Site Otsego/Plainwell, Michigan

Sample Matrix	Laboratory Parameters	Analytical Method	Investigative No.	Field Duplicate No.	MS/MSD[1] No.	Matrix Total*
Floodplain Soils	CLP PCBs (aroclors)	8082	340	34	19	374
	CRL TOC	9060	340	34	19	374
Instream Sediment	CLP PCBs (aroclors)	8082	344	35	19	379
	CRL TOC	9060	344	35	19	379
Exposed Sediment	CLP PCBs (aroclors)	8082	340	34	19	374
	CRL TOC	9060	340	34	19	374

[1] MS/MSDs are not additional samples, but are instead investigative samples on which MS/MSD analyses are performed
* The matrix total does not include MS/MSDs and duplicate/spike samples
**This table accounts for a total of approximately 1,024 samples collected at 256 locations with four depth intervals

FIGURES



SOURCE: U.S.G.S. 7.5 MINUTE TOPOGRAPHIC MAPS.
OTSEGO, MICHIGAN QUADRANGLE.

FIGURE 1–1

SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM
U.S. EPA CONTRACT No. 68–W–00–119
TDD No. 0103–002
DOCUMENT CONTROL No. RFW67–2E–AAGD

SITE LOCATION MAP
ALLIED PAPER – KALAMAZOO RIVER SITE
U.S. EPA – REGION V
Otsego–Plainwell, Michigan

HERNANDD–04/27/01–10.17–J:\CAD93\100\12201

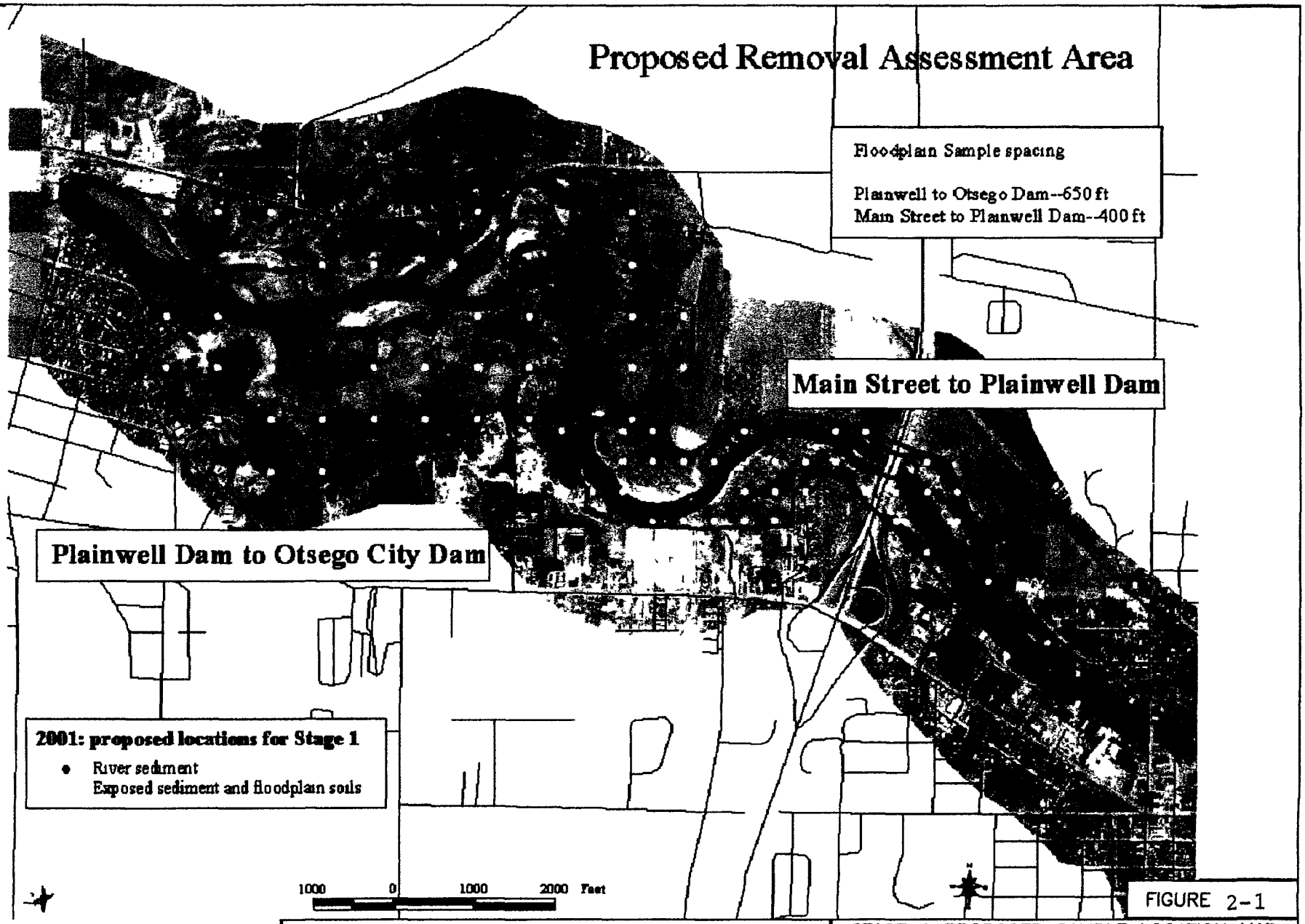


FIGURE 2-1

SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM
U.S. EPA CONTRACT No. 68-W-00-119
TDD No. 0103-002
DOCUMENT CONTROL No. RFW67-2E-AAGD

STAGE 1 PROPOSED SAMPLE LOCATION MAP
ALLIED PAPER - KALAMAZOO RIVER SITE
U.S. EPA - REGION V
Otsego-Plainwell, Michigan

HERNANDO-05/02/01-10:39-J:\CAD83\100\12401

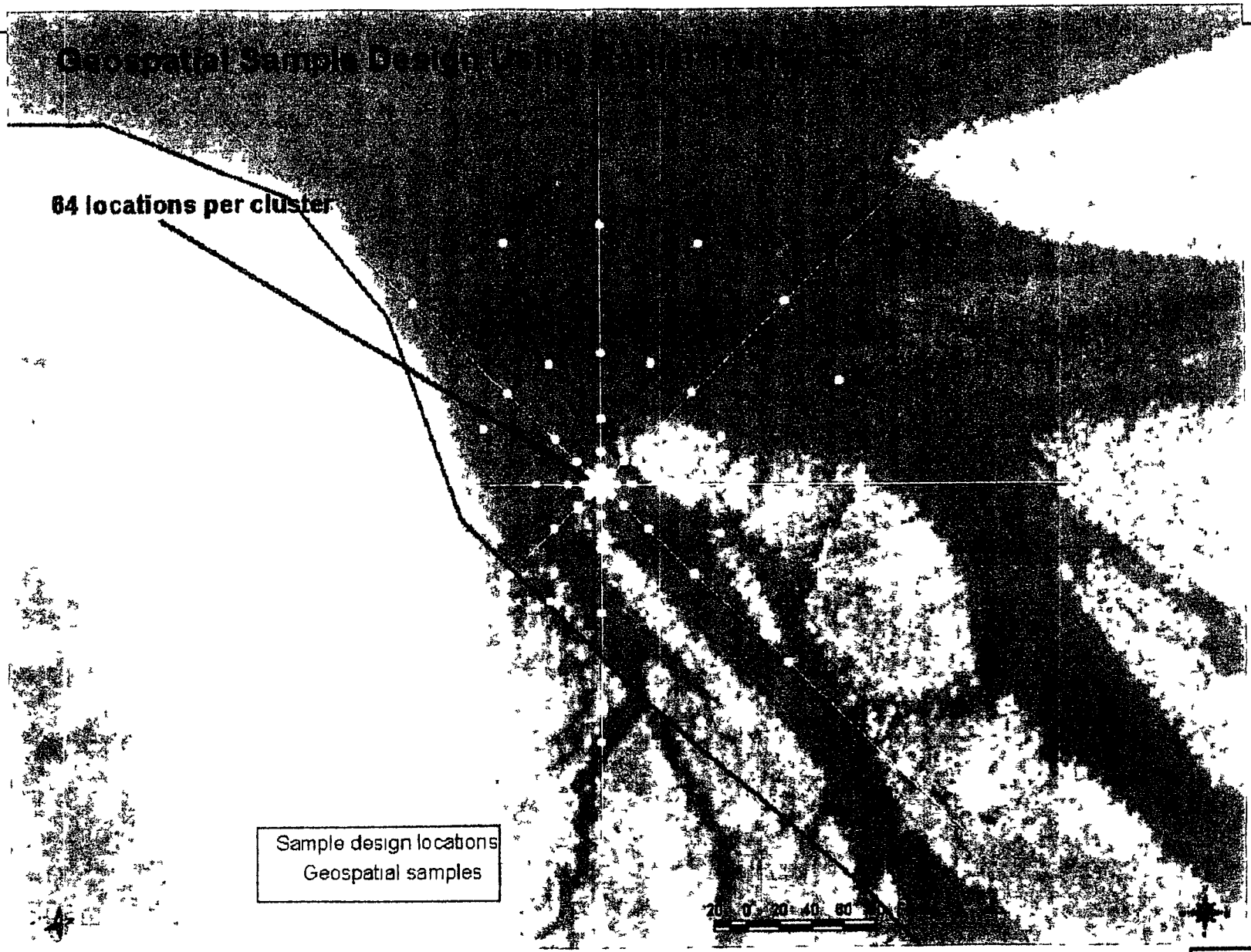


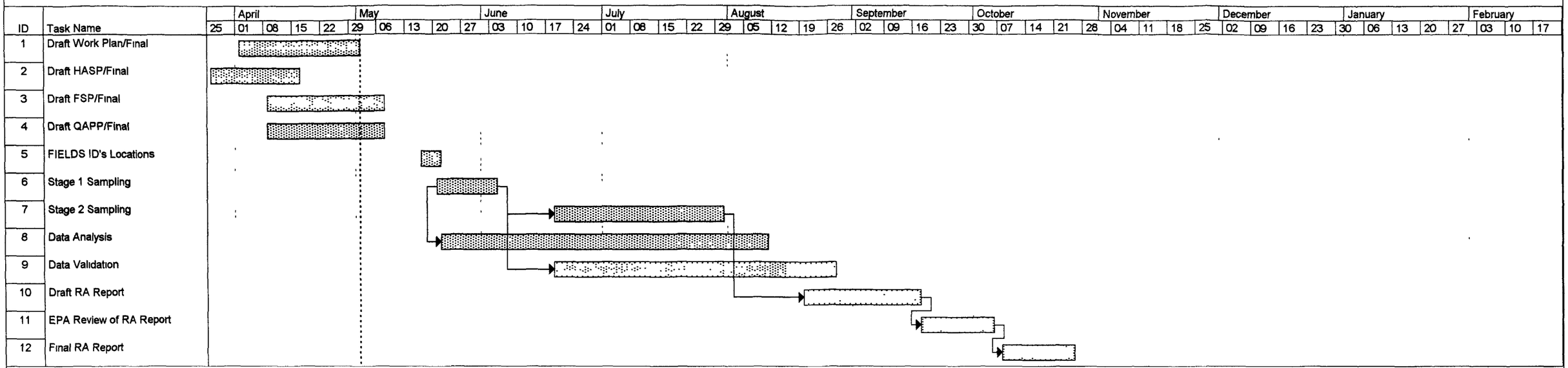
FIGURE 2-2

STAGE 2 PROPOSED GEOSPATIAL SAMPLE DESIGN
ALLIED PAPER – KALAMAZOO RIVER SITE
U.S. EPA – REGION V
Otsego–Plainwell, Michigan

WESTON MANAGERS DESIGNERS/CONSULTANTS
750 E. Bunker Ct.
Suite 500
Vernon Hills, Illinois
60061

Allied Paper - Kalamazoo River Site
Project Schedule

Figure 4-1



Project AP Kalamazoo R Project
Date Wed 05/02/01

Task | Progress | Summary | Rolled Up Split | Rolled Up Progress | Project Summary

Split | Milestone | Rolled Up Task | Rolled Up Milestone | External Tasks

APPENDIX A

Kalamazoo River 2001 Removal Assessment
FIELDS proposal
20 March 2001

DRAFT

Sam Borries, OSC
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Tim Drexler, FIELDS projects manager

John Bing-Canar, Environmental Scientist
Chuck Roth, Environmental Protection Specialist
Nina Yeskis, Research Associate, Geologist

Objective: Removal assessment

The Kalamazoo River RI/FS presents large-scale remediation alternatives based on data from 1994 that does not address several important questions. The sampling was done in transects 2,000-3,000 feet apart, effectively creating remediation units incorporating large blocks. In addition a confidence interval of the average PCB concentration suggest a mean between 0 and 1000 ppm, a range too broad to address any removal strategy other than addressing the entire sediment volume. With limited choices remaining as a compromise remedy, the following issues need to be addressed:

Without the appropriate data necessary for modeling of contamination, the present assumption in the RI/FS of no hot spots is in question. The existing data end up supporting complete removal of all sediments, which may not be necessary. A refined sample design will provide more accurate, defendable mass/volume estimates and provide better analyses to determine removal area cost estimates based on clean-up goals. A remedy limited to the removal of the most contaminated areas could reduce estimated costs and allow the remediation process to proceed to the next step.

The different matrices (sediment, exposed sediment, and floodplain soils) do not seem to be adequately separated before the spatial analyses of PCB concentrations. Boundaries for each matrix need to be determined and each matrix analyzed independently. Additionally, although floodplain soils were determined to not be a human health or ecosystem risk, high levels of PCB have been found in floodplain soils. Of 1122 sample analyses labeled floodplain soil, 236 (21%) had PCB concentrations over 5 ppm. Additional information as to the relationship

and possible transport of PCBs to and from soils is needed. It is not immediately clear which of the floodplain soil samples are native soils and which are exposed sediments, since the exposed sediments are only indirectly addressed, in some cases categorized as sediment and others as floodplain soil. Descriptors on the reach for each sample indicate when cores are within former impoundments, but do not clearly distinguish exposed sediment from floodplain soil.

The total sediment volume has not been estimated with sampling specifically designed for the purpose. Without an accurate measure of the total volume of sediment present there is no context with which to analyze the magnitude of the contamination problem. Although sediment thickness may be estimated by utilizing each core's thickness, core thickness may not be representative of the complete sediment column. Additionally, the spatial density of cores is too low for accurate estimation. Remote sensing technology or sediment pokes generate a more complete coverage from which to estimate the volume of sediment. The extent and thickness of exposed sediment needs to be more closely examined as well.

It is notable that the RI/FS considers the river dynamic and capable of naturally reducing surface concentrations of PCB over time. Of concern are the assumptions made on the amount of time that will be needed to meaningfully reduce PCB concentration in bioavailable sediments. Since the majority of the sampling took place on the river in 1994, it is not clear what the natural remediation time frame is based on. The proposed pilot study will provide additional data on the natural processes of scour and redeposition in the Kalamazoo River and the extent of natural remediation since 1994.

In order to proceed with remediation decisions, and to make those decisions defensible, a removal assessment plan is being proposed. Two sections of the river and floodplain extending approximately 1.0 -1.5 miles each would be sampled, with a core density based on a geostatistical analysis of the sample clusters designed specifically for variogram analysis. The removal assessment would clarify the extent of the PCB contamination at the scale necessary to accurately estimate costs of removal for the removal assessment area and more accurately estimate costs for PCB removal for the entire river.

The core sampling for the removal assessment would be carried out in the spring of 2001 using a START contractor. Sampling is expected to take 7-9 weeks, with the results available shortly thereafter. A 3-D interpolation and analysis would be completed by early summer. If the removal assessment proves useful, additional areas can be selected for assessment and targeted for removal. Alternatively, if the results confirm the original findings, the remediation decisions can proceed with minimal delay.

Work plan

Purpose

- Provide information to define and evaluate alternative remedies. Provide criteria for a more refined cost analysis for contaminated sediment removal at the Kalamazoo River superfund site.
- Delineate sediments, exposed sediments, floodplain soils and the extent of contamination in each. Results can then be analyzed in terms of % of the total volume and % of mass removed.
- Refine the estimation of the volume of sediment that would need to be removed within the study area.
- Provide a more complete understanding of the relationship of PCBs and the Kalamazoo River sediment and soil that will be used to direct Kalamazoo River sampling and remediation area determination.
- Provide data for comparison to the 1994 sampling in the removal assessment area.

Removal Assessment Areas:

Identify two representative areas of the Phase I portion of the river. Two areas have been selected as a preliminary step, however the final decision on site location would be determined by a consensus of the participating parties.

Each section should be approximately 1.0-1.5 river miles in length, and is expected to sample a representative cross-section of sediment type, flow characteristics, and histories. Additionally, the areas need to contain all three substrates of concern, in-stream sediment, exposed sediment, and floodplain soil. The length of each section is determined, in part by the logistics of the site, and also the by the ecological assessor's criteria for determining the units of concern (1 mile, the home range size of mink).

The preliminary site locations are:

Section 1. Plainwell dam to Main Street.
Section 2. Otsego dam to Plainwell dam

Section 1. Plainwell dam to Main Street. The upstream section is somewhat channelized with the downstream section comprised of a former impoundment. Channel length is 1.8 miles.

Section 2. Otsego dam to Plainwell dam. The upstream section of the river has multiple (possibly shifting) channels and a more extensive floodplain. A single channel section resumes in the downstream portion of section 2. Channel length is 1.8 miles.

Sample design and strategies

START/FIELDS

The design utilizes hot spot sampling on an unaligned grid (FIELDS software). GPS coordinates will be provided for navigation to each sample location. Core samples should be taken where practical, with surface grabs where coring cannot be achieved. Instream

cores in 1994 were taken to refusal using Lexan tubing driven by hand. A mechanical method, as yet not determined may facilitate more complete cores. 1994 slicing intervals were 0-2", 0-6", 6-12", 12-24", and 1-foot increments until refusal. Although 0-2 inches is not a practical removal depth, it may be necessary for comparison to 1994 and may be viewed as the biologically available zone. 1994 soil cores were taken to refusal of the Lexan tube driven by hand, as well. In order to obtain a more consistent core depth, exposed sediment and soil cores should be taken using a hand auger to 60 inches, where practical, to each depth: 0-6", 6-12", 12-24", 24-36", 36-48", 48-60". GPS positions (+/- 1 cm horizontal, +/-2 cm vertical) will be taken for true elevation of each core.

The sampling will progress in three stages. A total of 100 locations will be sampled in stage one, 50 locations in section 1 and 50 locations in section 2. (see attachment 1). The number of locations will be proportional to each area sampled using a systematic grid, providing locations with high concentration, low concentration, and non-detects for stage two.

Stage two will sample with a radial grid using an adaptive fill about selected hotspots (see attachment 2). Cores should be taken by stepping out the predetermined distance of 5, 10, 20, 40, 80, 160 feet in each of eight directions (radially). Additionally, 8 additional locations are located in both the 80 ft and 160 ft distances for a total of 64 locations in each cluster. FIELDS will flag or mark each location via GPS. Samples will only be analyzed if the previous core on the radial had a PCB detect. However, each cluster will need to be completely cored, with samples preserved and sent for analysis as determined by previous results. The second stage sampling will provide data for correlation analysis and to examine hot-spot size. Four clusters area planned, 2 for instream sediment and 2 for exposed sediment with a total of 256 cores (note that the number of cores taken may be more than double that analyzed).

Stage three will incorporate the variography and the hot spot size estimation from stage two to produce a probabilistic sample design based on the likelihood of detecting a hot spot of pre-determined size. Proceeding with stage three will depend on the practicality and cost of reliably detecting and delineating removable hotspots.

FIELDS

GPS of the boundaries of the exposed sediments and floodplain are needed for volume determination and interpolation.

FIELDS

A bathymetric survey, dependent on water depth in the study area, would be needed to give accurate elevations of cores for 3-D interpolations. If water levels are too shallow (under 3ft) core locations would need to be determined using a total station GPS (1 cm accuracy) to give the necessary vertical accuracy.

FIELDS

Sediment probes are needed to sample sediment thickness and estimate the total sediment volume. Probe locations will be predetermined based on a sampling grid and then located in real-time using GPS (+/- 1 m).

Cores

- Instream cores to refusal using Lexan tubes.
  0-6", 6-12", 12-24",....
- Exposed sediment and soil cores to 60 inches using a hand auger to each depth:
  0-6", 6-12", 12-24", 24-36", 36-48", 48-60".

- GPS positions, +/- 1 m but may need a total station (+/- 1 cm) for true elevation.

Analysis using a CLP lab

- Total PCB concentration
- TOC
- % solids and wet density for sediment
- Dry or bulk density for soils
- Physical array (see Todd Goeks)

Preliminary results in 72 hours
Electronic reporting of final results.

Modeling

SAS and FIELDS GME for correlation analysis
earthVision-for 3D interpolation and analyses
ArcView-for visualization and presentation
FIELDS software-for analyses

Mass/volume estimation

For a series of removal scenarios:

Removal volumes and post cleanup average concentrations
Total mass and % mass removed